

# Performance Standards

## Turning-Chucking

### Material

Cold rolled steel or low carbon steel,  $\text{Ø}2" \times 4.5"$

### Duty

Setup and carry out chucking operations for turning.

### Performance Standard

Given raw material, part print, hand, precision, and cutting tools, as well as access to an appropriate turning machine and its accessories, produce a part matching the print specifications using appropriate trade techniques and speeds and feeds. The part specified should have at least three diameters within  $\pm .005"$ , two bores within  $\pm .005"$ , one UNC external thread, and require at least two chuckings or other workholding setup.

### Other Evaluation Criteria

1. Finishes are at least 125 Ra microinches.
2. No sharp edges.

*Accuracy Level:*  $\pm .015$  on all fractions,  $\pm .005$  on all decimals unless otherwise specified on the blueprint.  
Diameters to be coaxial within  $.002$  total run out.

### Assessment Equipment and Material

*Workstation:* A common workbench, an engine lathe of 14"X 30" minimum capacity, a three jaw universal scroll chuck, and a four jaw independent chuck. The lathe must have a quick change gear box with the threads called for on the print available from the gear box.

*Material:* A part matching the material requirements of the turning blueprint, material: Mild steel.

*Tooling:* Tool post, right and left hand turning tools capable of turning to a square shoulder, an external threading tool matched to the profile of the thread called out on the turning print, a boring bar and boring tool capable of boring to a square shoulder, a drill chuck, centerdrill, and assorted drills necessary to rough out the bore, magnetic base for a dial indicator, thread wires for chucks, files, wrenches as necessary.

#### *Measuring*

*Instruments:* Required micrometers, combination set, thread pitch gages center gage, pitch micrometer, plug gage and thread ring, dial indicator, 6" rule, a 6" vernier, dial, or electronic caliper, telescoping gages or inside calipers, and surface finish comparison plates.

*Reference:* Machinery's Handbook

# Performance Assessment Worksheet

## Turning-Chucking

**INSTRUCTIONS:** Rate the candidate's performance for the Turning- Chucking job according to the criteria below. The checklist below represents only a listing of criteria to be evaluated. It is *not* a sequence of process steps or a process plan for making the part. For each item, check the box under Pass or Fail accordingly.

Remember, NIMS requires that **all** specifications must be met within the allowable tolerance limits. If the part does not meet **all** specifications, the candidate must correct or redo the project.

Candidate Name \_\_\_\_\_

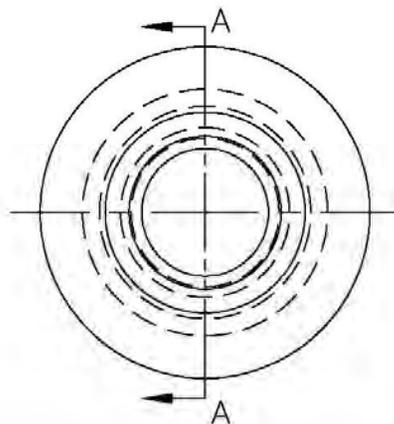
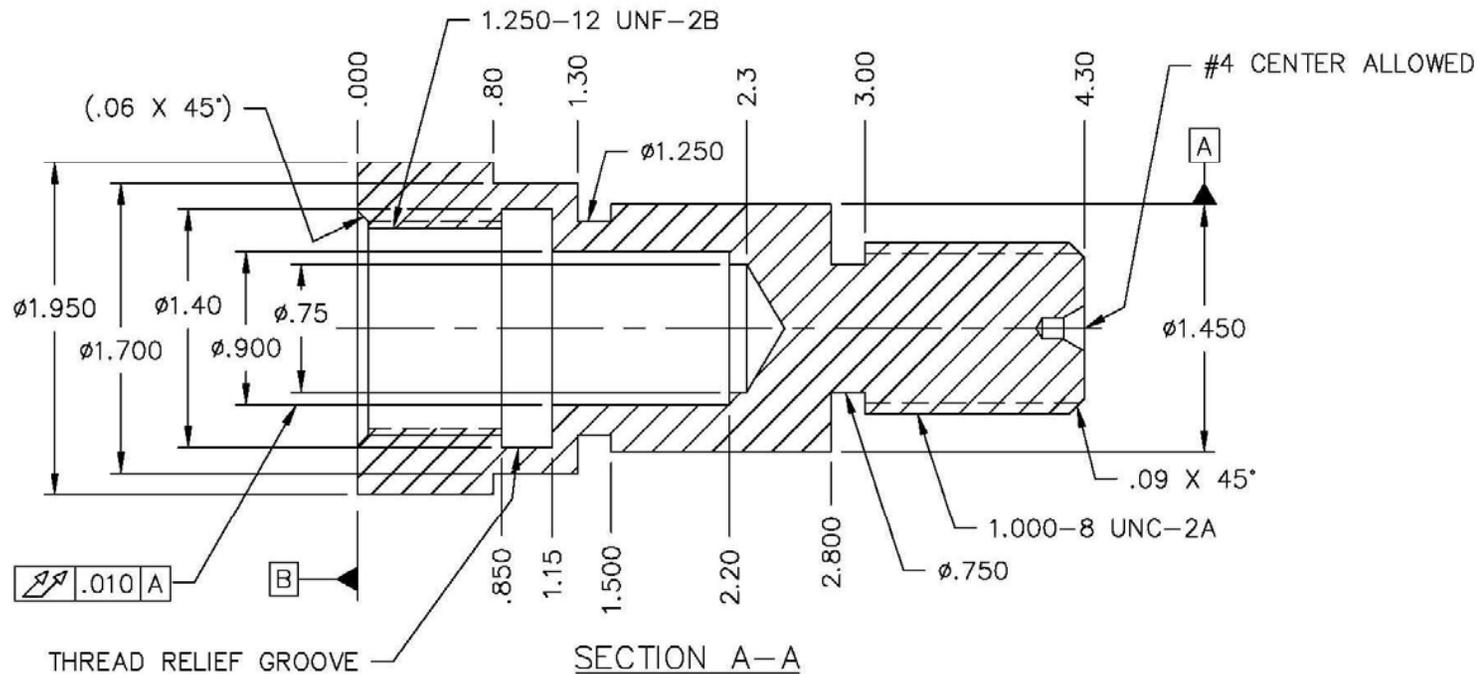
Evaluation Date \_\_\_\_\_

<b>Performance Project – Turning-Chucking</b>		<b>Pass</b>	<b>Fail</b>
<b>Evaluation Criteria</b>			
1. Length dimensions .80 ± .015 1.30 ± .015 2.800 ± .005 4.30 ± .015	Pass = all dimensions within tolerance Fail = one or more dimensions not within tolerance	<input type="checkbox"/>	<input type="checkbox"/>
2. Outside diameters Ø1.950 ± .005 Ø 1.700 ± .005 Ø1.450 ± .005	Pass = all dimensions within tolerance Fail = one or more not within tolerance	<input type="checkbox"/>	<input type="checkbox"/>
3. Groove dimensions Ø.750 ± .005 Ø1.250 ± .005	Pass = both grooves within tolerances Fail = one or both grooves not within tolerance	<input type="checkbox"/>	<input type="checkbox"/>
4. External thread 1-000-8 UNC 2A thread Pitch diameter: 0.9100 / 0.9168	Pass = Gage “go” compliance or within pitch diameter tolerance Fail = Accepts “no-go” gage or out of pitch diameter tolerance	<input type="checkbox"/>	<input type="checkbox"/>
5. Internal thread 1 .25 -12 UNF - 2B thread	Pass = meets “Go” condition on gage Fail = Accepts “No-go” gage	<input type="checkbox"/>	<input type="checkbox"/>
6. Drill and bore hole 2.20 ± .015 bore depth 2.3 ± .032 drill depth Ø.75 ± .015 drill hole	Pass = all dimensions within tolerance Fail = one or more dimensions out of tolerance	<input type="checkbox"/>	<input type="checkbox"/>

<b>Performance Project – Turning-Chucking</b>		<b>Pass</b>	<b>Fail</b>
<b>Evaluation Criteria</b>			
7. $\varnothing$ .900 bore concentric to datum A .010 TIR	Pass = TIR of .005 or less Fail = TIR exceeds .005	<input type="checkbox"/>	<input type="checkbox"/>
8. Coaxial on all non-threaded diameters .010 TIR on all diameters	Pass = all diameters within TIR callout Fail = one or more diameters exceed TIR callout	<input type="checkbox"/>	<input type="checkbox"/>
9. Bore diameter .900 $\pm$ .005	Pass = within tolerance Fail = out of tolerance	<input type="checkbox"/>	<input type="checkbox"/>
10. External surfaces $\perp$ surfaces to datum B .005	Pass = all surfaces perpendicular within .005 (Reference surface is datum B) Fail = one or more surfaces exceeds .005	<input type="checkbox"/>	<input type="checkbox"/>
11. Surface finish	Pass = 125 Ra microinches or better Fail = over 125 Ra microinches	<input type="checkbox"/>	<input type="checkbox"/>
12. Sharp edges not to exceed .015	Pass = no sharp edges Fail = sharp edges or edge break exceed .015	<input type="checkbox"/>	<input type="checkbox"/>
<b>END OF TURNING-CHUCKING EVALUATION</b>			

*It is important to note that the part must be 100% within the tolerances listed on the print. The criteria listed here are a guide for instructors and supervisors. Not every dimension is included in this guide. Nonetheless, the completed part must be 100% within the specifications of the print. The print takes precedence over this guide when the parts are inspected by the MET-TEC committee. The part print and the Performance Affidavit should be sent along with the part to the MET-TEC for evaluation. Send to NIMS only the completed Performance Affidavit, signed by the MET-TEC members. A copy of the Performance Affidavit should be retained in the candidate's file documenting completed performance for this credential.*

REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	UPDATED DRAWING AND TITLE BLOCK	3/7/05	LW



**NOTES:**

1. FINISH ALL OVER 125 MICROINCHES MAX
2. BREAK ALL SHARP EDGES .015" MAX.
3. EXTERNAL SURFACES:  $\square \square \phi .005$  B
4. ALL EXTERNAL NON-THREADED DIAMETERS:  $\square \square .010$  B A

<p>UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M-1994</p> <p>TOLERANCES  .X ± .032 .XXX ± .005  .XX ± .015 ANGLES ± 1 DEG.  FRACTIONS ± 1/64</p>	MACHINING SKILLS LEVEL 1		
	Job Duty 2.4 Turning Operation, Chucking		
	DESIGNER	DK	11/8/01
DWG CHK			
DWG APPD			
SCALE	FULL	DWG.#98601	SHEET 1 OF 1

DO NOT SCALE DRAWING

**NIMS PROCEDURAL REQUIREMENTS**

1. SUBMIT THIS PRINT AND WORKPIECE ALONG WITH THE PERFORMANCE AFFIDAVIT FOR EVALUATION